

No.	Commentator	Section/ Reference	Comment Issue	Comment	EPA Response
Evaluation of Natural Recovery					
1	ODEQ			Question 1 – Does the NRRB and CSTAG agree with EPA’s assessment that the utility of the LWG’s model to evaluate MNR at the Portland Harbor Site is limited – in terms of evaluating the absolute as well as the relative effectiveness of the remedial alternatives in achieving RAOs through MNR?	
2	ODEQ			Question 2 – Does the NRRB and CSTAG recommend that EPA delay issuing the ROD until an MNR model is developed that accurately predicts recovery timeframes?	
3	ODEQ			Is there national precedence for EPA selecting a sediment remedy without a functioning MNR model?	yes
4	ODEQ			Does EPA or the Corps of Engineers have resources at the national level that could resolve the shortcomings with the LWG’s model without further delaying issuance of the ROD?	Probably not
5	ODEQ			Given the current lack of confidence in the LWG’s MNR model, could EPA’s selected remedy incorporate an adaptive management framework that could be informed by potential improvements with the MNR model and/or post-ROD monitoring?	
6	Five Tribes			The Five Tribes’ first preference is development of a model to reasonably forecast natural recovery and provide a more solid basis for alternative selection. If efforts to revise the model are not successful, EPA must use environmentally protective assumptions and select a remedy that does not rely heavily on natural recovery.	
7	Five Tribes			In the presentation of deposition and erosion based on bathymetric surveys (Appendix C, p. 5), we do not understand why 2.5 cm/yr would be identified as depositional if 2.7 cm/yr was the minimum detectable sediment deposition rate for one of the study year comparisons. It seems as though the threshold for deposition should be values equal to or greater than 2.7 cm/yr (essentially the sediment deposition detection limit). This change has the potential for more areas to be classified as erosional and may influence the selected remedy. We request additional justification for this decision and/or a change to the analysis assumptions. The ratio of sediment contaminant subsurface-to-surface concentrations is one of two means of classifying an area as depositional. We believe that this criterion merits more discussion in Appendix C (e.g., on p. 6 of Appendix C). Degradation rates of contaminants are often different in subsurface sediment conditions as compared to surface sediment conditions. It is unclear how much this would affect the calculated ratio, and therefore it is unclear if the ratio really provides an accurate picture of deposition.	??

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Evaluation of PTW					
8	Five Tribes			We support EPA's definition of PTW for the site. PTW should be defined based on calculated risk. PTW defined by higher contaminant concentrations at other sites is not relevant to EPA's definition of PTW at this site.	disagree
Capping of PTW					
9	Five Tribes			No mobile PTW should be left in the river. By its very definition, mobile PTW cannot be reliably contained. The Five Tribes do not support capping of this material, no matter how engineered the cap is. This material may migrate horizontally, either now or in the future when environmental conditions, such as hydrology, change. Any structures impeding dredging of this material should be removed. Mobile PTW at depth should be dredged using all available means.	Disagree unless perhaps NAPL
10	Five Tribes			EPA selected organoclay reactive caps for locations where NAPL is present and where containment is assigned (p. 3-14). However, since EPA does not provide evidence that these caps will be effective at containing NAPL, the Five Tribes are skeptical of the potential success of this type of cap. The Five Tribes are in favor of removal of all NAPL. If any is to be left in place, EPA should provide sufficient supporting evidence that these caps can be successful. For instance, the McCormick and Baxter cap is referenced, but there is no mention of its success or failure.	Likely agree
11	Five Tribes			EPA conducted a modeling effort to "determine the maximum concentrations of PTW material that would not result in exceedances of Ambient Water Quality Criteria (AWQC) in the sediment cap pore water after a period of 100 years" (p. 3-14). A description of the modeling effort is provided in Appendix D. The appendix describes the approach as a screening model for developing concentration estimates of PTW that can be reliably contained. The "screening model" designation suggests that there may be certain limitations of the model and perhaps that general assumptions were used, but its results are being used to make major site decisions. If this is an appropriate model to make FS-level decisions, that point needs to be clarified in the text.	
Evaluation of Riverbanks					
12	Five Tribes			EPA states that the protectiveness of RAO 1 (beaches) will be qualitatively evaluated. First, we do not see any evaluation of RAO 1 (beaches) in the FS. Second, we believe that EPA should better define beaches and should describe the anticipated mechanisms for risk reduction. Does EPA define beaches as above the high tide line or some other water-based or vertical datum, resulting in beaches being outside of the scope of active remediation? If so, what is the relationship between beaches and riverbanks (i.e., are beaches a subset of riverbanks)? What would be the mechanism	

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				for risk reduction on beaches (e.g., riverbank capping, upland source control, deposition of cleaner material from the remediated Willamette River sediment bed during high tide events)? These points should be clarified in the FS and Proposed Plan.	
Dredging Assumptions and Construction Duration					
13	Five Tribes			Reliance on the optimistic dredge production estimates from Schroeder and Gustavson (2013; Section 4.1.8 of FS) likely underestimates construction durations for the alternatives, and therefore the cost.	??
14	CAG			The community is not opposed to 24 hour dredging as some PRP's have suggested. The fact is that the community would like to see work completed as quickly as possible and the noise caused by nighttime dredging would be limited relative to the significant amount of noise already generated during nighttime hours by working harbor industries.	
Dredge Residuals and EMNR					
15	Five Tribes			EPA proposes deploying a 12-inch sand layer over all dredged areas to "control residuals and releases" (p. 3-19). We question whether a 12-inch sand layer will sufficiently contain the residuals. We would like to see a cap model applied to residuals, using conservative (i.e., environmentally protective) assumptions about residual surface sediment concentrations post-dredging. Without such an analysis, we are not confident that a 12-inch sand layer will be adequately protective.	
16	Five Tribes			The FS states that the placement of thin-layer sand covers in the navigation channel and future maintenance dredge areas is "incompatible with current and future waterway uses" (p. 3-7). It is our understanding that a 12-inch sand cover will be applied to all dredging areas, including the navigation channel and future maintenance dredge areas (e.g., p. 3-32 of the July 29, 2015, version of FS Section 3). We request that EPA clarify this apparent discrepancy.	
17	Five Tribes			The FS assumes that enhanced monitored natural recovery will be accomplished through the placement of a 12-inch layer of sand (p. 3-27). The Five Tribes are not confident that a 12-inch layer of sand without additives will sufficiently reduce risk within a reasonable timeframe for non-PTW areas. We would like to know what information was used to support this decision to use sand without additives in non-PTW areas. Similar to the use of a 12-inch sand layer over all dredged areas, we would like to see a cap model applied to EMNR areas, using pre-remedy surface sediment concentrations. Without such an analysis, we are not confident that a 12-inch sand layer without additives will be adequately protective.	

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Data					
18	CAG	FS Section 4		The estimates of PCBs in sediments from upriver coming into Portland Harbor need to be updated with new information. In the case of the Lower Duwamish, older estimates turned out to be too high by nearly twofold- the same is likely true on the Willamette River in Portland Harbor.	
19	Yakima Nation			<p>Using background sediments upstream from the Portland Harbor Site that are contaminated to set remedial action levels for the cleanup results in a remedy that will pose risk to human health and the environment. The background concentrations are based on limited data collected from contaminated locations upriver from the Site. In addition, the background data were collected almost a decade ago and background concentrations are expected to decrease over time as inputs to the watershed are controlled.</p> <p>Background concentrations should be measured, preferably at regular intervals consistent with remedial design and construction, with improved analytical methods for persistent organic pollutants, like PCBs, which drive risk in sediments site-wide. Newer data should measure PCB congeners to provide a more robust and consistent data set. In addition, the data available currently were either incomplete or had inadequate detection limits for several compounds, such as TBT, dieldrin, and aldrin, such that background concentrations could not be determined.</p>	
Risk Evaluation					
20	Yakima Nation; Five Tribes			<p>Human health and the environment must be protected, but none of the remedial alternatives evaluated in the Feasibility Study (FS) meet the protectiveness criteria without institutional controls, including limits on fish consumption in perpetuity. At the completion of construction, none of the alternatives will meet the acceptable risk range. Since modeling to evaluate the effectiveness of the alternatives in reducing risk over the long-term was determined to be infeasible, there is no assurance that any of the alternatives will ever meet the criteria for protectiveness.</p> <p>A perpetual fish consumption advisory will be needed following the implementation of any of the alternatives in order to protect fish consumers. This fact demonstrates that the designated fishable use of the waters in the project area will be impaired following the cleanup.</p>	
21	Yakima Nation			Numerous historical and/or current sources of PCBs and other persistent organic pollutants are likely to continue to negatively impact health risks and non-cancer health hazards for people who use the Site unless adequately addressed.	
22	Yakima Nation			The BERA indicates through multiple lines of evidence that sediment contamination (with persistent organic pollutants [PCBs, PAHs, dioxins/furans, and DDT and its derivatives] and metals) pose a large unacceptable risk and on-going ecological threat	

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				to organisms within the Site. The adverse health of these organism and the overall ecological health at the Site expands to impact the health of surrounding human communities.	
23	Five Tribes			We support the fish consumption rates used in the Baseline Human Health Risk Assessment (BHHRA) and carried forward to the FS. Consumption rates in Oregon are typically higher than elsewhere in the country, including for tribal fishers (FWQC 2013, CRITFC 1994). The BHHRA accurately reflects this reality.	
24	Five Tribes			We request that EPA present a comparison of numeric risk reduction for each alternative. These reductions are provided for each alternative, but they are not compared in tabular or graphical format. It would be helpful to show a side-by-side comparison of the risk reduction that occurs from one alternative to another. In comparing alternatives, it would also be useful to create an analysis where the Alternative B values are set to unity (1), and values for all other alternatives are expressed as a multiple of Alternative B. The FS (p. 4-7) references residual risk figures in Appendix H, but no figures are provided in this appendix. The Five Tribes requested these figures in our September 24, 2015, comments on Section 4 but have not yet received them. We believe that these figures may be important in our review of the effectiveness of each alternative.	
25	Five Tribes			There is a need for a more robust analysis of risks to workers and the community from the incrementally more aggressive alternatives. Accident rates can be predicted with much greater precision than other project-associated risks. The probability of traffic accidents, injuries, and deaths will increase from Alternative B to G; those risks should be discussed.	
LWG Recommended Approach to Cleanup [using headings and sub-headings in LWG's comment document]					
26	LWG			1.0 Focus on managing the most significant and pervasive risks. 1.1 Adopt Cleanup Goals that Can Be Achieved by the Sediment Remedy 1.2 Adopt PRGs that Address Realistic Risks from the Risk Assessments 1.3 Focus on Risk Reduction, Rather than Mass Removal 1.4 Consider Measures to Reduce Interim and Short-term Exposures 1.5 Acknowledge that Sediment Cleanup Will Not Remove Fish Advisories	
27	LWG			2.0 Reduce the uncertainty about natural recovery. 2.1 Site-specific and Robust CSM 2.2 Quantitatively Evaluate the Effectiveness of MNR	
28	LWG			3.0 Improve the accuracy and transparency of the assumptions behind the remedial alternatives. Explain how additional risk reduction justifies higher cost actions. 3.1 Remove "Principal Threat Waste" Designation from Materials that Can Be Reliably Contained 3.2 Do Not Require Treatment of PTW when No Additional Risk Reduction Is Achieved	

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				3.3 Assign and Compare Technologies on a Localized Scale 3.4 Compare Long-term Effectiveness of the Alternatives Quantitatively 3.5 Use Practical, Real World Construction Assumptions to Evaluate Short-term Effectiveness 3.6 Evaluate Implementability Using Realistic Information when Comparing Remedies 3.7 Use Accurate Cost Information to Evaluate Cost Effectiveness 3.8 Revise the FS Evaluations	
29	LWG			4.0 Maximize flexibility in remedy design and implementation. 4.1 Allow Flexibility to Refine and Adjust Technologies and Process Options During Remedial Design 4.2 Allow Flexibility When Delineating SMAs during RD/RA 4.3 Separate the Site into Operable Units Focused on the Most Important SMAs 4.4 Incorporate Flexibility into the ROD	
30	LWG			5.0 LWG Recommended Remedy If EPA follows the recommended approach set out by the LWG in this letter, including reasonable PRGs based on appropriate risk management, the resulting remedy would have the following characteristics: <input type="checkbox"/> RALs that are appropriately applied to surface sediments consistent with the methods and results of the BLRAs and that focus on active remediation of the highest contaminant concentrations: – PCB RAL of 1,000 µg/kg – DDE RAL of 1,000 µg/kg – cPAH (as BaPEq) RAL of 20,000 µg/kg – Designated CBRAs consistent with the multiple lines of evidence evaluation of benthic toxicity in the BERA <input type="checkbox"/> Flexible technology assignments assigned to SMAs or OUs, with an appropriate balance of removal and in-place technologies at the harbor-wide scale (e.g., capping, in situ treatment, and EMNR). We anticipate this will equate to approximately 50% dredging and 50% in-place technologies (by site-wide acreage). Technology assignment must take into account that the longer it takes to implement the remedy, the longer the impact to the river and the fish, and the longer it takes the system to recover. <input type="checkbox"/> No identified PTW beyond management of identified “substantial product” at the Gasco Sediment Site consistent with 2009 Gasco Order. <input type="checkbox"/> Appropriate application of in situ and ex situ treatment of a significant volume of materials at the site through application of the above appropriate RALs and technology assignments. <input type="checkbox"/> Use of OUs to manage the site based on the localized chemical and physical characteristics.	

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				<input type="checkbox"/> Exclude riverbank soils remedies (leaving those to be designed and implemented through either DEQ upland source control program or future sediment remedial designs). <input type="checkbox"/> Refinement of technology process options in remedial design (e.g., types of dredging and dredge BMPs, types of treatment, and habitat and flood mitigation methods).	
Stakeholder and Public Input					
31	CAG			It is critical that EPA allow sufficient time for public notice and comment on whatever remedy is selected following the assessment of the Remedy Review Board.	
32	CAG			It will be a significant challenge to disseminate and provide technical support to the diverse communities that will be directly and indirectly affected by this decision. We ask that a public comment period of significantly longer than 60 days be planned for.	
33	Five Tribes			Of great importance to the Five Tribes is that we remain engaged throughout RD and be given opportunities to provide feedback, including instances where EPA is considering granting the LWG the opportunity to deviate from the ROD.	
Source Control					
34	ODEQ			Assurance is needed that EPA's remedy aligns CERCLA with the Clean Water Act by following national guidance on implementation of water quality criteria and other Clean Water Act programs. This, along with jointly agreed to definitions of sediment recontamination and acceptable in-water risk, will aid in on-going collaboration between DEQ and EPA on development of a valid monitoring plan to demonstrate remedy success. A well-defined data management plan and actively managed database must be critical components of the long-term monitoring plan.	
35	CAG			<p>Source control is a critical component, which requires assurances of effectiveness, even if under the jurisdiction of the state of Oregon.</p> <p>DEQ informed the PHCAG in a June 10, 2015, general meeting that upland manufacturing sites are not considered brownfields until they change zoning for development. Only then are they "flagged" by DEQ. PHCAG wants to know how many contaminated industrially zoned sites are not considered brownfields even though they have contaminated groundwater going into the river.</p> <p>Another major area of risk is the hazard posed by the fuel tank farms in the Linnton/Willbridge area where 90% of the entire region's fuel supply passes through. The fuel tank farms are adjacent to the Willamette River edge in the Superfund site on liquefiable soils. During an earthquake, these tanks will cause an environmental catastrophe, contaminating the river with PAH's and other assorted toxic chemicals. EPA should require as part of the to move or stabilize these tanks to prevent an environmental disaster when the Cascadia Subduction Zone earthquake hits.</p>	

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36	Yakima Nation			Adequate upland source control measures must be in place prior to the cleanup to protect the river from recontamination. Source control will require effective coordination with the State of Oregon and the application of appropriate state and federal authorities, as well as continued monitoring of tributaries and receiving waters.	
37	Yakima Nation			There are many properties within the Portland Harbor Superfund Site that are ongoing sources of contamination from groundwater pathways. The complexity of shallow groundwater flow over the entirety of the Site is a consideration. Because groundwater is a continuing source of contamination to the river, it should be carefully considered as part of the cleanup. Contaminants from background sources, upland sources, and groundwater pathways should be reduced to levels such that recontamination of the remediated Site does not occur. EPA and the State of Oregon should coordinate activities, including enforcement as needed, to eliminate ongoing sources of contamination to the Willamette River.	
Balancing of Remedy Selection Factors					
38	ODEQ			We encourage EPA to build adaptability into the remedy so that it allows for refinement as additional data become available, particularly during remedial design. The unique physical and contaminant distribution characteristics of individual sediment management areas will likely warrant variations from the generic approach and this should be explicitly recognized in the ROD.	
39	ODEQ			EPA should select a remedial alternative for Portland Harbor that is protective of human health and the environment, while considering cost and the following factors that also are of significant importance to the State: <input type="checkbox"/> Assuring that the remedy is implementable from an administrative and technical perspective. <input type="checkbox"/> Achieving the Remedial Action Objectives more quickly. <input type="checkbox"/> Reducing risk remaining at construction completion. <input type="checkbox"/> Limiting habitat impacts and need for mitigation. <input type="checkbox"/> Limiting reliance on engineering controls over large areas that may adversely impact current and future uses of the Harbor. <input type="checkbox"/> Limiting reliance on institutional controls, such as fish advisories, which often have low reliability. <input type="checkbox"/> Limiting restrictions on current and future uses of the Harbor and impacts on business opportunities. <input type="checkbox"/> Limiting reliance on monitored natural recovery, except in specific locations where there is a strong scientific consensus that it will be effective. <input type="checkbox"/> Minimizing implementation risk.	

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Opportunities to Reduce Cost in Refining the Preferred Alternative					
40	ODEQ			There are significant differences between the LWG and EPA cost estimates for the remedial alternatives identified in the FS. ODEQ encourages the NRRB and CSTAG to assess the reasons for these substantial differences, and to look for ways that EPA can reduce costs without undermining the protectiveness and overall feasibility of the remedy. ODEQ is concerned that potentially liable parties will choose to litigate rather than implement a remedy that is too expensive or based on an estimate that is not transparent and that does not accurately reflect the true costs of the preferred remedy. The cost estimate should neither underestimate nor overestimate the true cost of the remedy and it should clearly identify costs that have been estimated for contingencies and long-term monitoring and maintenance activities.	
41	ODEQ			<p>ODEQ requests that the NRRB and CSTAG consider whether the following refinements of remedial alternatives could substantially reduce costs while not decreasing overall protectiveness and feasibility:</p> <p><input type="checkbox"/> Eliminate ex situ treatment of principal threat waste unless required by RCRA/TSCA.</p> <p><input type="checkbox"/> Eliminate cap amendments even for principal threat waste (except in NAPL areas) unless they are determined to be necessary during remedial design (i.e., defer this determination to RD).</p> <p><input type="checkbox"/> Select enhanced monitored natural attenuation (EMNR) as a contingency measure for Swan Island Lagoon instead of a primary element of the remedy. Consider other opportunities for continent remedies.</p> <p><input type="checkbox"/> Reduce the physical isolation layer for sediment caps to the more traditional thickness of two feet unless a thicker layer is determined to be necessary during remedial design (i.e., defer this determination to RD).</p> <p><input type="checkbox"/> Reduce reliance on dredging in "Intermediate Areas" unless there is a clear impact on beneficial uses of the Harbor and perhaps defer this determination to RD.</p> <p><input type="checkbox"/> Set the maximum dredged depth to be more dependent on vertical contamination trends and consideration of incremental reduction in overall contaminant mass rather than a fixed maximum dredge depth of 15 feet as specified in EPA's draft FS. Also, switch to an engineered cap instead of dredging if removal does not substantial reduce contaminant mass. Possibly defer this determination to RD.</p> <p><input type="checkbox"/> Incorporate some level of flexibility during remedial design to switch between capping and dredging depending on the amount of debris, nature of docking and other structures, steepness of bed slopes and size of the designated cap or dredge area.</p> <p><input type="checkbox"/> Incorporate less aggressive PAH Remedial Action Levels (RALs) in navigational areas where direct exposure to this non-bio-accumulative contaminant is less likely.</p>	

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				<input type="checkbox"/> Refine GIS mapping where there appear to be anomalies that overestimate the size of the sediment management areas. We note that EPA's contaminant distribution maps show much larger areas of contamination than the corresponding LWG maps. EPA should compare its GIS interpolation protocol to the LWG's process detailed in Appendix E Chap 5 of their draft FS. We also encourage EPA to work with the LWG in solving this relatively simple technical difference.	
Flexibility					
42	Five Tribes			<p>It is our understanding, based on conversations with EPA, that if the ROD requires an area to be dredged, the responsible parties do not have the flexibility to cap that area (i.e., if it entails a deviation from the technology assignment approach). A decision to cap in an area previously designated as dredging would require a ROD amendment. More broadly, if a point of flexibility is not specified in the ROD, it is not a flexibility that the responsible parties can exercise during RD; a ROD amendment would be required. We support this lack of flexibility and believe it is important for all interested parties to understand what the ROD does and does not allow. Transparency is important.</p>	
43	Five Tribes			<p>The LWG has expressed significant concern that EPA's technology assignment approach is not nuanced enough. For instance, the LWG seems concerned that RD data will indicate that dredging in a designated dredge area is not technically feasible, and another active remediation technology must be employed (e.g., a small area is too close to a major structure to be dredged to the required depth, or slope failure is predicted due to deep dredging depths in a confined area). While we believe this situation to be rare, we support EPA adding language to the Proposed Plan to allow EPA to grant the responsible parties permission to use an alternative active remediation technology if the responsible parties present a strong case that dredging is not feasible. This exception could only be used for small areas, and the Five Tribes would like to be involved in the decision to grant an exception.</p>	
Reliance on Fish Advisories/Institutional Controls					
44	ODEQ			<p>Acknowledging that fish advisories will have to be used until RAOs are achieved, they should be as time-limited as possible and bridge as small of a risk gap as possible. Moreover, the remedy should ensure there are adequate budgetary resources allotted to public health agencies for implementing advisories, and detail the responsibility for monitoring the effectiveness of the remedy over time through fish tissue sampling and analysis. The State also seeks advice from the NRRB and CSTAG on methodologies for developing a better understanding of fish consumption rates in order to assess the effectiveness of the advisories and to refine the advisories as appropriate.</p>	

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45	CAG; Yakima Nation			Institutional Controls are not effective and are intended to be temporary. The focus should be on removing contamination to achieve safe levels for fish consumption as well as other activities as quickly as possible.	
River Recreational and Fishing Access					
46	ODEQ			ODEQ encourages a remedy that results in as little curtailment of fishing and recreational activities as possible. Loss of boating access to the river; specifically, actions that would eliminate access at the two developed boat ramps at Cathedral Park and Swan Island Lagoon and any action that would preclude the development of additional boat access sites in the future, are of particular concern.	
47	CAG; Five Tribes			The remedy must ensure that public trust values are preserved including opportunities to restore the ecology of the river and improve recreational access.	
State Proprietary Authorization of Remedial Action and Impacts of Capping Large Areas of Sediment					
48	ODEQ; Five Tribes			Engineered caps, in particular, should be limited and designed (e.g., location, thickness, material, etc.) in a manner that minimizes the impact to public trust uses and that will require less compensation to the State. The State also does not support the use of highly restrictive "Regulated Navigation Areas" such as those promulgated for the McCormick & Baxter sediment cap and the GASCO Early Action temporary cap.	
Protection and Enhancement of Shallow Water Habitats					
49	ODEQ			Existing shallow water depths profiles should be maintained in areas requiring dredging as well as capping. And, shallow water sediment caps should be covered with habitat friendly substrate.	
50	CAG			In those cases where remediation requires substrate removal, the PRPs need to restore the habitat to conditions that are suitable for living resources, in terms of quality of substrate, physical characteristics and replant any vegetation that is removed. Any significant temporary or permanent loss of natural resource function as a result of cleanup actions should be fully mitigated within Portland Harbor and mitigation sites should be permanently protected via easement or other legally binding mechanism.	
Protection of Riverbank and Shallow Water Habitat					
51	ODEQ			Where the remedial action includes disturbance of riverbanks the State recommends that a more gradual slope be constructed consistent with upland uses. This will better connect the riverine habitat with the upland.	

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52	Five Tribes			<p>The FS explains that the “shallow water criterion of 4 feet NAVD88 was based on an assumed cap thickness of 3 feet (if capping were to be applied) and a mean lower low water (MLLW) elevation of 7 feet NAVD88” (p. 3-9). We do not know how this definition of shallow water relates to the NMFS definition of 20 feet below MLLW. We support the authority of the NMFS for determining habitats that are of importance to fish. It is our understanding that EPA’s intention in giving separate consideration to shallow water areas is that they acknowledge the important habitat value that these areas provide to aquatic life. We ask that EPA rectify their definition of shallow water to be consistent with the NMFS definition.</p> <p>EPA’s discussion of shallow water areas (p. 3-9) does not explicitly consider changing water levels in the Willamette River. Factors such as low-water level years and river water level trends (particularly due to climate change) should be discussed in this section to justify or modify the shallow water designation.</p>	
Adequacy of Engineering Controls During Dredging					
53	ODEQ			We recommend that EPA identify sites with significant levels of persistent, bioaccumulative and toxic substances and further describe the engineering controls necessary during dredging to limit releases and impacts to the food web.	
54	CAG			EPA needs to require monitoring during dredging operations to ensure that the health of our communities and river is not compromised during operations on the river.	
55	Five Tribes			<p>Potential impacts to water quality and contaminant releases to the system during construction need to be better estimated.</p> <p>The effectiveness of BMPs should be examined.</p>	
56	Five Tribes			<p>We agree that dredging and other sediment handling are likely to resuspend contaminated sediments, potentially increasing fish tissue COC concentrations. However, we are unsure whether fish tissue COC concentrations will decrease between construction periods each year, as many COCs, such as PCBs, are not readily metabolized. We suggest that EPA clarify this point and provide the technical basis for its assertion, if any.</p>	
Disposal Options- CDF and Upland Disposal					
57	ODEQ			<p>EPA should not preclude the use confined disposal facilities as part of the remedy. A CDF at Terminal 4 can be designed and managed to be protective of people and the environment, and should be considered as an element of the remedy that is selected. Also, consideration should be given to placing dredged material in stable upland areas where adjacent facility property is available, particularly where contaminants are below levels protective of upland exposure pathways or where future upland remedies are planned. This would reduce transportation requirements and neighborhood disturbance.</p>	

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58	CAG			The engineering and logistical issues for long-term effectiveness of a CDF at T4, Slip 1 are not proven in this complex river system. Community-wide rejection of a proposed CDF has been overwhelming.	
59	CAG			The Oregon Department of Fish & Wildlife studied the stretch of the Willamette River near Terminal 4 and determined that sturgeon use the area of the river just outside of Slip 1 for juvenile rearing. Community members who regularly fish the area have reported that large numbers of sturgeon utilize the slip during the winter months. The sturgeon population in the Willamette River continues to decline, potentially leading to consideration for threatened and endangered listing, and the CAG would want to see every effort made to protect, restore, and expand habitat used by sturgeon, and not fill habitat that they currently use.	
60	CAG			The CDF does not adequately address the impact of the Cascadia Subduction Zone earthquake with the proposed design using an earthen berm and liquefiable contaminated soils that it will contain. Modeling was done for a 7 in which engineers admitted it would suffer damage. It will be unlined, located on a former slough, with several sources of ground water flowing into it. The CAG was told earlier by EPA that the flow through design is an experimental design and EPA has not supplied an example of such a CDF on an active, large volume river such as the Willamette.	
61	CAG			The CAG is concerned about the nature of contaminants that would be allowed to be placed in the CDF, and concerns were increased when an engineer on the project stated that higher level contaminants could be placed toward the back of the slip. This seems unlikely to succeed given that the process of filling the slip is described as basically adding a slurry of dredge spoils into a huge vat of water and letting the water then flow through the front of the berm into the river.	
62	CAG			The cost of engineering, construction maintenance and monitoring in perpetuity, coupled with the risk of a second clean up if a failure happens, makes the CDF a very expensive proposition, the liability could become the taxpayers problem since T4 is a publicly owned entity, the Port of Portland and the risks of a highly concentrated body of persistent pollutants becomes the burden of the neighboring communities.	
63	CAG			The proposed CDF has been under-modeled for flood hazard. It's been modeled for the 100 yr flood but would be located within both the 100 and 500 year flood hazard zones as defined by federal government flood hazard maps (see attachment). Additionally, the impact of global climate change and sea rise will increase the flood potential and force at this site.	
64	Five Tribes			Although the Five Tribes prefer complete removal of contaminated sediments off-site, we could potentially support an upland CDF, if and only if the result on balance would be a more protective, permanent remedy (e.g., higher volume of sediment removal) and rigorous standards are fully met for its design, construction, operation, maintenance, and monitoring in perpetuity. None of this section applies to a confined aquatic disposal (CAD) cell, which the Five Tribes would oppose in any instance.	

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Impacts on the State Transportation System/Neighborhood from Transport					
65	ODEQ			The State encourages consideration of barge and rail transportation for off-site disposal of dredge material and import of capping materials. Transportation by trucks would result in increased road congestion that has economic, community livability and environmental impacts. On an infrastructure level, pavement performance and service life can be diminished with heavier traffic than what was anticipated during road design.	
66	CAG			Disruption within the neighborhoods should be kept to an absolute minimum. To that end sediments should be transported to appropriate landfills to the greatest extent possible by barge, with train transport being a secondary option where necessary and truck transport kept to an absolute minimum. Any contaminant transport through neighborhoods should require the absolute highest standards for containment to ensure that fugitive dust is kept to a minimum. Materials dredged at night should be stored until daylight hours when transport through neighborhoods is required.	
Sediment Management Area Delineation					
67	ODEQ			EPA should clarify the role of surface vs subsurface contaminant concentrations in SMA mapping during RD. The State believes that surface sediment (defined in the RI/FS as 0 – 30 cm) should be the primary factor that determinates SMA boundaries so that the realized benefits of MNR are accounted for in the final SMA-specific remedial designs. A secondary line of evidence should consider the magnitude of subsurface contamination in highly erosional areas, as was done with the Lower Duwamish Waterway Superfund Site. The State seeks input from the NRRB and CSTAG in developing a decision process for SMA mapping in light of the highly dynamic nature of deposition/erosion in Portland Harbor.	
Additional In-Water Work Period					
68	ODEQ			There are two in-water work periods in the Harbor area: July 1st to October 31st and December 1st to January 31st. The second period is limited to activities below -20 feet National Geodetic Vertical Datum 1947. Flows are higher during the December to January in-water work period and migrating and rearing Chinook and Steelhead will preferentially use littoral and beach areas during this time period, so work in those areas should be avoided. However, this second window may allow for some dredging and capping activities that would shorten the total amount of time needed to complete the final remedy as well as reduce costs.	

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Use of Technology Assignment Decision Trees/ Implementability					
69	Five Tribes			<p>The following comments pertain to the multi-criteria matrix (Figure 3.3-14b). [Comments are abbreviated here]:</p> <p>(55) The Five Tribes wonder what biases the matrix introduces. (56) In the presence of moderate to heavy debris, the matrix assigns a 0 to armored capping and a 1 to EMNR/cap. The logic behind this assignment is unclear. (57) In depositional areas, we think it would be most appropriate to assign a 0 rather than -1 to dredging since deposition is not an impediment to dredging. (58) No area of the site is currently classified as “rock, cobble, or bedrock” (p. 3-10), yet this factor is included in the matrix. If EPA anticipates that this substrate may be encountered during RD sampling efforts and includes the factor for this reason, we support leaving it in the matrix, with a note explaining the reason for inclusion. (59) An asterisked note under the matrix table reads, “For those grid cells assigned EMNR/Cap, if the grid cell is within a Sediment Management Area (SMA) then an engineered cap is assigned, if the grid cell is outside a SMA then EMNR is assigned.” This note would lead the reader to believe that EMNR is widely applied to areas outside of SMAs. It is our understanding that this is not the case. (60) Section 3 uses two criteria to indicate whether an area was erosive: wind- and vessel wake-generated waves and shear-stress on bottom sediments during high flow events (p. 3-8). Figure 3.3-14b shows that these conditions share some of the same scores. However, the final score that is selected based on the matrix is unclear. (61) The deposition section states that areas were evaluated based on two lines of evidence: (1) difference in elevations between bathymetric surveys and (2) the ratio of surface to subsurface sediment concentrations (p. 3-8). Figure 3.3-14b implies that only one of these criteria must be satisfied to consider an area depositional, as opposed to both needing to be satisfied. It also implies that a cell would only receive one score for the depositional category, not one score for each of the deposition lines of evidence. Given the importance of this site condition in the success of EMNR and capping (and assuming EPA can sufficiently justify the rationale for using the surface to subsurface ratio, per our earlier comment), we suggest either: (1) the two lines of evidence each receive their own score or (2) in order to receive a depositional designation, both lines of evidence must be satisfied. EPA’s methods regarding the above points need to be clearly stated in the text. (62) The FS describes three scoring outcomes from the matrix: a technology receives the highest score, technologies are tied, or an area does not receive a score (an outcome when the area does not achieve the threshold for any of the criteria) (p. 3-12). The implication of a technology receiving no score is unclear, and it is difficult to imagine the circumstance that would give rise to a no-score outcome. (63) The FS states that in the event of a tie, the least intrusive remedy will be selected (p. 3-12). The Five Tribes are concerned about this decision rule. (64) The matrix currently assigns a score of 1 to armored cap and EMNR/cap in the</p>	

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				<p>presence of rock, cobble, or bedrock, and structures or pilings. The Five Tribes do not believe that these conditions favor these technologies. (65) If sediment is designated PTW, the Five Tribes strongly urge EPA to actively remediate it in some way. In the current shallow water flowchart, if PTW is outside an SMA and can be reliably contained, then it is assigned MNR. Similarly, in the intermediate flowchart, if PTW is outside an SMA, can be reliably contained, and is not designated EMNR in the matrix selection process, it inexplicably receives an assignment of MNR. (66) For shallow and intermediate areas, if PTW exists under a structure and within an SMA, then it is assigned a reactive armored cap regardless of whether the material can be reliably contained. The Five Tribes request that a decision point be added to the flowchart under these conditions that asks whether PTW can be reliably contained. If it cannot be reliably contained, a significantly augmented reactive cap should be assigned. Also, if there is PTW under a structure that is not reliably contained, then removal of the structure should receive extra consideration. (67) The flowcharts contemplate scenarios where PTW is identified outside of SMAs. The Five Tribes are interested to know under what circumstances this occurs at the site, and how frequently. EPA should consider whether it is appropriate to define SMAs as areas exceeding RALs or areas containing PTW, not just as areas exceeding RALs. (68) The shallow water flowchart indicates that if the RAL concentrations are not expected to be reached within 5 feet depth, the contaminated sediment will be dredged to 3 feet and replaced with an engineered cap (also described on p. 3-32). The depth criterion in this analysis is an important decision point. The Five Tribes would like to minimize capped areas to the extent practicable – in part, to limit the amount of contamination left in place, and in part to limit areas of the river with use restrictions in perpetuity. (69) According to the shallow and intermediate flowcharts, NAPL or PTW that is present in an SMA and not reliably contained will be dredged, and a significantly augmented cap with backfill will be used (also as described on p. 3-32). Although it seems less likely that the material would migrate vertically through a reactive cap and other material totaling 15 feet in thickness, we are concerned about lateral migration.</p>	
More Aggressive Cleanup is needed					
70	CAG; Yakima Nation; Five Tribes			<p>Even the most aggressive clean-up option (G) is insufficient to achieve the health and ecological goals of the community and required by law. The CAG favors a more vigorous cleanup than Alternative G, we refer to this alternative as G+, a more protective and permanent remedy. This alternative will reduce the acreage of MNR from that in Alternative G, reduce the extent of capping and increase the amount of surface contamination removed.</p> <p>We agree with EPA Region 10 that the site is largely not depositional, many areas are erosional, and much of the near shore areas are subject to prop scour, tidal action, ship wakes, seasonal scouring and other disturbances, and thus MNR must be</p>	

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				employed sparingly, not widely. Natural recovery is not effective for contaminants that do not breakdown, in fact, we view natural recovery as what it is- burial and dispersal, not treatment. In the absence of a reliable predictive model, the EPA should err on the side of caution with aggressive removal of contaminants---not leave them in place and hope without any scientific basis that a strategy that has not been effective over the course of many decades will suddenly become effective now. The CAG does not support remedies that leave extensive amounts of contaminated materials in the river including over-reliance on MNR and use of CDFs.	
71	CAG			At a minimum, the dredge footprint needs to be great enough to reach COC levels much closer to the background concentrations for PCBs. Based on the data in Fig. 3.3-01, this increase would have to be from 500 acres to at least 1000 acres, most of which is in the areas with soft sediments.	
72	Five Tribes			<p>Devising the most appropriate remedy requires not only best science, but also creative problem solving to determine the most effective way to achieve a protective remedy. EPA noted that they are looking at a hybrid approach to the remedy, possibly combining several alternatives. We support and encourage this sort of creative thinking, which is especially critical given that the FS does not convincingly demonstrate that even Alternative G is sufficiently protective.</p> <p>The Five Tribes recognize that selecting an alternative that is more aggressive than Alternative G would result in a very long construction period (greater than 18 years), with the attendant construction-related impacts to local communities and the environment (both in-river and out of river). Therefore, we urge EPA to explore development of a new alternative that more effectively targets risk reduction. We ask that EPA evaluate whether there is a way to “mix and match” the remedial action levels (RALs) to maximize risk reduction while minimizing construction impacts. This approach may include selecting, for instance, the Alternative E RAL for one contaminant, the Alternative G RAL for another contaminant, and an even more protective RAL than Alternative G for yet another contaminant. The approach may also potentially include selecting one set of RALs for one sediment decision unit (SDU) and another set for another SDU. The Five Tribes are not able to conduct this evaluation using the information presented in the FS; we request that EPA investigate this approach using the underlying data.</p> <p>We request that EPA add SMA “footprints” to this series of figures to facilitate the evaluation of the effectiveness of the alternatives in addressing non-focus COCs. In general, the SDU selection process needs to be better described. Also, figures and tables need to be clarified as related to SDUs.</p>	

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Use of Alternative Technologies					
73	CAG			We support the use of effective alternative treatment technologies for dredged contaminated sediment and for in situ treatment when available. Section 3 of the EPA version of the FS presents alternatives for treating dredged materials, including on-site remediation through biological (biodegradation), chemical (sorption and oxidation) or physical (sedimentation or dispersion) processes. The CAG supports and encourages implementation of pilot projects to determine the potential effectiveness of these methods in the lower Willamette River.	
74	CAG			Several examples of newer technologies are presented, including environmental dredging, sediment washing, bioremediation, mobile UV decontamination, NASA's redeployable polymer blanket, and EcoSoil®.	
Seismic Concerns and Climate Change					
75	CAG			The remedy needs to be designed to withstand a Cascadia Subduction Zone earthquake, meaning a level 9 earthquake;	
76	Yakima Nation			The FS should have evaluated how known geologic hazards, specifically seismic shaking intensity, amplification, and liquefaction, may impact the reliability, long-term effectiveness, and permanence of the remedial alternatives. For alternatives that involve MNR, EMNR, or capping, geologic hazards may affect the long-term efficacy of the remedy.	
77	Yakima Nation; Five Tribes			Also, the FS could consider how a changing climate may impact the reliability, long-term effectiveness, and permanence of the remedial alternatives. Key potential climate change impacts that may be expected for the Portland Harbor include increased heavy precipitation events, sea level rise, and increased flood risk. Please refer to the Climate Change Adaptation Technical Fact Sheet: Contaminated Sediment Remedies (EPA, 2015).	
Environmental Justice/Cumulative Risk					
78	CAG			We are particularly concerned about underserved communities, communities that rely on subsistence fishing for both cultural and economic reasons, and the neighborhoods in general that are near or adjacent to the river. Minority and Native American communities, and those in the neighborhoods of industry have been exposed and EPA needs to address both Environmental Justice and Cumulative Risk issues. Communities adjacent to the North Reach of the Willamette have been a historic dumping ground for the negative effects of industry including not only the Superfund site, but hazardous materials tank farms, industrial air pollution, truck diesel exhaust	

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				and truck movement. North Portland is also the location for a sewage treatment plant for the entire City, and a major, former city-wide dump.	
Cost is Not the Most Important Factor					
79	CAG			Too much focus has been on the raw numerical potential costs of clean-up without any reference to context for those costs. There are several important elements of the cost that should be considered, including complexity of site, financial resources of PRPs, resources already spent on restoration, cleanup will generate revenue and jobs. All the other factors need to be given due consideration as well---the CAG is deeply concerned that cost appears to be trumping community health, environmental health and public trust doctrine values.	
Compliance with Clean Water Act, other ARARs					
79	CAG			The CAG is especially concerned with the need to meet Clean Water Act criteria and standards for the contaminants of concern for the Portland Harbor site. Water Quality Standards for PCBs, dioxins, PAHs, DDT, metals need to be met by the remedy such that the waters of the Willamette support native animals and plants, do not further harm threatened and endangered species, and are safe for human recreation and more. Alternative G+ is needed to remove the additional contamination that prevents achieving Clean Water Act requirements.	
80	Yakima Nation; Five Tribes			None of the alternatives evaluated in the Feasibility Study will comply with ARARs. Chemical-specific numeric human health and aquatic life water quality criteria and relevant State of Oregon narrative criteria will not be met with the cleanup alternatives evaluated. EPA should develop a plan to return the Willamette River to a status of health, particularly for the contaminants such as DDT, DDE, PCBs, and PAHs that are causing 303(d) impairment of the waters and for which currently there is no TMDL underway nor a process to delist.	
81	Yakima Nation; Five Tribes			The FS section 2.1.1 also states that the measure of protectiveness of human health and the environment included in the Oregon Hazardous Substance Remedial Action Rules, OAR 340-122 “are considered applicable to the Portland Harbor site.” However, “acceptable risk ranges” considered in the FS appear to be based not on these values, but on a broader and less protective risk range used by EPA. For example, in Section 4.2.2.3, it is stated that “Estimated post-construction cancer risks...are generally less than 5×10^{-5} , which is within EPA’s acceptable risk range.” However, this exceeds the acceptable risk range of 1×10^{-5} , which was determined to be an ARAR.	

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Spatial Scale					
82	CAG			We are concerned that the “hotspot” approach now being advocated by EPA appears to revert back to a very large scale approach. The EPA should prioritize removal of contaminated sediments from the hotspot areas but it should also apply an approach that utilizes a finer scale approach to applying removal, capping and MNR to areas outside the hotspots which still comprise more than 65% of the harbor. Surface sediments that contribute to water quality impairment need to be removed via Alternative G+.	
83	Five Tribes			Limiting work to the SDUs would limit the construction duration beyond what is estimated in the FS (for Alternatives F and G), which would minimize construction-related adverse environmental effects and impacts to the local communities. However, the Five Tribes will only support this approach if SDUs are expanded to incorporate any principal threat waste (PTW) or non-aqueous phase liquid (NAPL) that fall outside of current SDUs. In addition, the SMA in River Mile 7 East (RM7E) that is across from the RM7W SDU should also receive active remediation (if it is not already incorporated based on the PTW/NAPL rule stipulated above). This area is an SMA even under Alternative B, indicating that contaminant concentrations are high.	
Monitoring During and Following the Remedial Work					
84	CAG; Yakima Nation; Five Tribes			We call on EPA to implement a rigorous monitoring program with rapid turnaround of lab analysis, to ensure the safety and welfare of the community.	
85	CAG; Five Tribes			Examples of monitoring approaches are presented (by the CAG). During the Hudson River dredging, five quality of life performance standards were developed: air quality, noise, odor, lighting, and navigation. These standards were established to reduce the effects of dredging on people, business, and communities. The monitoring was re-evaluated and adjusted as needed as the dredging moved throughout the river.	
86	CAG			It is noted that tidal action can reverse the direction of flow, such that all sites should be monitored both up and downstream for contaminate redistribution.	
87	CAG			Monitoring biota during remedial operations and post-construction period is an important element to confirm the effectiveness of the remedy and confirm that conditions improve. Indeed, experience at other CERCLA sites demonstrates the importance of long term monitoring, especially monitoring animal tissues (fish, shellfish, birds, invertebrates, etc.). Examples are provided.	
88	CAG			The cleanup must be done from upstream down and monitoring should be done to at least the mouth of the Multnomah channel and perhaps as far as the Sauvies Island bridge. 80% of the Willamette’s flow goes down the Multnomah channel. Points	

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				cleaned up from Schnitzer downstream should be monitored to the Columbia River slough and upstream from each cleanup site for at least half a mile because of tidal distribution.	
89	CAG			Besides monitoring, every cleanup action must contain a contingency plan in case of excessive pollution releases to air or water. There should be an easy process for community members to report problems that result from cleanup operations to the EPA for action.	
Long-term O&M/Assurances					
90	CAG			The Plan needs to include a strong operations and maintenance section that will ensure that any remedies such as capping will be regularly evaluated to ensure that the integrity of the remedy is fully maintained in perpetuity and that any breaches are quickly repaired.	
91	Five Tribes			The Five Tribes are concerned with any entity's ability to manage a cap in perpetuity. Indeed, EPA has only been in existence for 45 years. Thus, there are no examples of EPA successfully managing sediment caps for long timescales. We are concerned with whether the relevant entities (the responsible parties and EPA) will even exist 100 years from now, and whether funding and political willpower will be available for monitoring and maintenance.	
Quality of FS/Transparency					
92	CAG			EPA has been more open and transparent to the public in the FS redrafting, meeting with the CAG and other community members and apprising the community of the process. We commend EPA for reformatting the FS, undertaking re-analysis and taking a broader view of the remedial options. The current FS is more concise, direct and easier to understand, presenting the critical information from the redrafted RI into the FS in a more manageable form.	
93	CAG	FS Section 4		The CAG supports that longer period for economic analysis [100 years instead of 30] because of the inclusion of burial (MNR) in each alternative.	
94	Five Tribes	FS Section 4		The Five Tribes find the analysis of alternatives in Section 4 of the FS (dated August 18, 2015) to be rather superficial and primarily qualitative in nature. The sheer magnitude of the decisions that will be made based on the FS requires a more rigorous, quantitative evaluation of the alternatives. Without such an analysis, we do not feel that EPA can adequately evaluate the merits of each alternative. In particular, we recommend that, to the extent possible, EPA apply a quantitative analysis to: (1) estimate natural recovery post-remedy, (2) more explicitly compare risk reductions at construction completion (T=0) across the alternatives, (3) evaluate the adequacy of the remedy in addressing non-focus COCs, and (4) integrate benthic toxicity data in a more robust manner.	

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95	Five Tribes			The information in the FS is not always clearly presented, and statements are not always well supported, as indicated in the examples above. Our comments to EPA on Sections 3 and 4 of the FS (dated September 11, 2015, and September 24, 2015, respectively) provide suggested clarifying changes to text, tables, and figures. They also note apparent discrepancies between the text, tables, and figures. The LWG has also identified numerous errors, both typographical and more substantive, in previous drafts and the current draft. It is important to present information as clearly and accurately as possible to maximize the utility of the FS in explaining the implications of each alternative to interested parties. Unclear or poorly supported statements or inaccuracies risk discrediting the substantial effort and expertise that EPA has put forward in drafting the FS and invites criticism from opponents. We request that NRRB/CSTAG encourage EPA to consider each of our suggestions to clarify the document, including our request that EPA do a thorough editorial review of the document and to carefully compare all figures and tables against the text and resolve any discrepancies.	
Compliance with Treaty of 1855 between the Yakima Nation and the USA					
96	Yakima Nation			The proposed remedies do not fully comply with the Treaty of 1855 between the Yakama Nation and the United States of America. The Treaty, which reserves specific rights and resources for the Yakama Nation, should be acknowledged as an applicable or relevant and appropriate requirement (ARAR) or a “must comply” standard for cleanup decisions. This requirement includes the right to fully practice subsistence activities in Yakama usual and accustomed use areas. EPA’s cleanup should protect and not conflict with treaty rights.	
Releases from the Site to the Columbia River					
97	Yakima Nation			Releases from Portland Harbor are major contributors to the contamination of resources in the lower Columbia River. To date, the EPA has failed to take into consideration the releases from the Site to the lower Columbia River. The RI and FS do not adequately use the data that were collected to discuss the loading and potential impacts to resources beyond the Site boundaries. Portland Harbor is contributing highly toxic PCBs, DDT, and polycyclic aromatic hydrocarbons (PAHs) and other pollutants to the Columbia River. As a result, the health of juvenile salmon in the Columbia River are impaired by exposure to these contaminants. Pacific lamprey and sturgeon are also at risk from these toxic substances.	

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Remediation around Structures					
98	Five Tribes			The FS assumes that structures servicing active wharfs or shore-based facilities will remain intact during remedial activities (p. 3-15). In contrast, we contend that EPA should explore removing all such structures to the extent practicable, particularly if they impede the removal of highly contaminated material.	